

# EUROPEAN PATENT OFFICE

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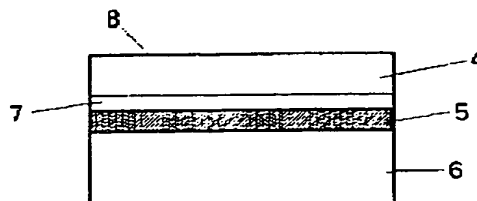
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APPLICANT : SUMITOMO ELECTRIC IND LTD;

INVENTOR : OKAMOTO AKIRA;

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TITLE : SINGLE CRYSTAL OXIDE THIN FILM  
HAVING ROCK CRYSTAL TYPE  
CRYSTAL STRUCTURE AND ITS  
PRODUCTION



ABSTRACT : PROBLEM TO BE SOLVED: To inexpensively produce a single crystal oxide thin film having an arbitrary film thickness and a smooth surface by forming the single crystal oxide thin film on a rock crystal type single crystal substrate.

SOLUTION: A precursor soln. containing 20-98mol.%  $\text{GeO}_2$ , 0-78mol.%  $\text{SiO}_2$  and 0.05-2mol.% Al or an alkali metal is applied on the rock crystal type single crystal substrate 6 and heated at 300-600°C to form a first intermediate layer 5. Then the precursor soln. containing 20-98mol.%  $\text{GeO}_2$ , 0-78mol.%  $\text{SiO}_2$  and 0.05-2mol.% Al or the alkali metal is applied on the first intermediate layer 5 and heated at 750-1100°C to form a second intermediate layer 7. Then, a precursor soln. containing silicon is applied on the second intermediate layer 7 and heated to a stabilizing temp. (750-1200°C) of the rock crystal type crystal structure to form a single crystal oxide thin film 4, and the intermediate layers 5 and 7 are dissolved and removed in water to obtain the single crystal oxide thin film 4 having the rock crystal type single crystal structure having 5-100nm surface roughness.

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